

## Abstract

An improved method and process for array shape inferencing for high-level array-based languages such as MATLAB and APL. The process is based on a framework that algebraically describes the shape of an expression at compile time. The method leverages on algebraic properties that underlie MATLAB's shape semantics and exactly captures the shape that the expression assumes at run time. Other highlights of this method are its generality and the uniformity of its approach. Compared with the traditional shadow variable scheme, the algebraic view permits powerful shape-related assertions and optimizations not possible in the conventional approach.